

Observational diagnoses of extratropical ozone STE during the Aura era

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The transport of ozone from the stratosphere to the extratropical troposphere is an important boundary condition to tropospheric chemistry. However, previous direct estimates from models and indirect estimates from observations have poorly constrained the magnitude of ozone stratosphere-troposphere exchange (STE). In this study we provide a direct diagnosis of the extratropical ozone STE using data from the Microwave Limb Sounder on Aura and output of the MERRA reanalysis over the time period from 2005 to the present. We find that the mean annual STE is about 275 Tg yr^{-1} and 205 Tg yr^{-1} in the NH and SH, respectively. The interannual variability of the magnitude is about twice as great in the NH than the SH. We find that this variability is dominated by the seasonal variability during the late winter and spring. A comparison of the ozone flux to the mass flux reveals that there is not a simple relationship between the two quantities. This presentation will also examine the magnitude and distribution of ozone in the lower stratosphere relative to the years of maximum and minimum ozone STE. Finally, we will examine any possible signature of increased ozone STE in the troposphere using sonde and tropospheric ozone residual (TOR) data, and output from the Global Modeling Initiative Chemistry Transport Model (GMI CTM).